The invention claimed is:

1. A process for hydrogenating an olefin-containing feedstock containing a plurality of different unsaturated olefinic hydrocarbon compounds, the process including:

subjecting the olefinic feedstock to bulk hydrogenation by means of catalytic distillation in a catalytic distillation zone containing a hydrogenation catalyst, and in the presence of hydrogen, thereby to hydrogenate unsaturated olefinic hydrocarbon compounds present in the feedstock into their corresponding saturated compounds; and

withdrawing the saturated compounds from the catalytic distillation zone.

2. The process according to claim 1 wherein said feedstock comprises from 60 to 100 mass% unsaturated olefinic hydrocarbon compounds.

3. The process according to claim 2 wherein said feedstock comprises from 80 to 100 mass% unsaturated olefinic hydrocarbon compounds.

4. The process according to claim 1 wherein unhydrogenated olefinic hydrocarbon compounds comprising lightest olefinic hydrocarbon compounds in said feedstock are recovered from said hydrogenation.

5. The process according to claim 1 wherein unhydrogenated olefinic hydrocarbon compounds comprising heaviest olefinic hydrocarbon compounds in said feedstock are recovered from said hydrogenation.

6. The process according to claim 1 wherein from 30 to about 100% of unsaturated olefinic hydrocarbon compounds are hydrogenated.

7. The process according to claim 1 wherein said bulk hydrogenation is carried out a pressure up to 1500kPa(g).

8. The process according to claim 7 wherein said bulk hydrogenation is carried out at pressure in the range of 50 to about 200kPa(g).

9. The process according to claim 1, 2, 3, 4, 5, 6, 7 or 8 wherein said feedstock comprises C_7-C_{13} naphtha.

10. The process according to claim 1, 2, 3, 4, 5, 6, 7 or 8 wherein said feedstock comprises oligomers obtained from the oligomerization of C_3-C_7 unsaturated olefinic hydrocarbons.

11. The process according to claim 1, 2, 3, 4, 5, 6, 7 or 8 wherein said feedstock comprises unsaturated hydrocarbon compounds derived from Fischer-Tropsch reaction.

12. The process according to claim 7 wherein the feedstock comprises C_7-C_{13} naphtha feedstock, said bulk hydrogenation is operating at pressure in the range of 100kPa(g)-200kPa(g) in a catalyst bed which is at a temperature in the range of about 120°C-140°C, with a product stream comprising saturated compounds being removed as a bottoms stream and an overheads stream comprising unreacted unsaturated olefinic hydrocarbon compounds being lighter compounds.

13. The process according to claim 7 wherein the feedstock comprises unsaturated olefinic oligomers derived from C_3-C_7 olefins, said bulk hydrogenation is operating at a pressure in the range of about 50kPa(g)-200kPa(g) in a catalyst bed which is at a temperature is in the range of about 160°C-200°C, with a product stream comprising saturated hydrocarbon compounds being removed as an overheads stream and a bottoms stream comprising unreacted unsaturated hydrocarbon compounds being heavier compounds.